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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/069,644 | 05/16/2002 | Nikolaus Benninger | 2034 | 3577 |

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EXAMINER:

MEDINA SANABRIA, MARIBEL

ART UNIT PAPER NUMBER

1754

DATE MAILED: 10/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/069,644 | BENNINGER ET AL. | |
| | Examiner | Art Unit | |
| | Maribel Medina | 1754 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 May 2002.
- 2a) ☐ This action is FINAL.
- 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
 - 1. ☐ Certified copies of the priority documents have been received.
 - 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 16, 23, 24, and 26 are objected to because of the following informalities:
 - a. In claim 16, line 8, “an Nox” should be changed to --a NOx--.
 - b. In claim 23, lines 2-3, the limitation that reads, “initiating an additional hydrogen” is unclear, the limitation should be changed to --initiating an addition of hydrogen--.
 - c. In claim 24, line 4, “the Nox” should be changed to --the NOx--.
 - d. In claim 26, lines 4-5, the limitation that reads “operates under low-load condition and temperatures therefore is a crucial factor” is unclear.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 16-25 and 27-30 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 6,122,909 (Murphy et al).

Regarding claim 16, Murphy et al disclose a method for treating an exhaust gas from an internal combustion engine in a motor vehicle (See col. 1, lines 5-16). The method comprises the steps of: obtaining hydrogen by electrolysis (instant hydrolysis) by a electrolysis unit (50) connected to a water tank (48); delivering a metered addition of the hydrogen to an exhaust gas

as a function of a demand for hydrogen occurring at certain operating states and/or functions of a catalytic converter (31); performing the delivery of the hydrogen in a direction of flow of the exhaust gas in a location selected from between an oxidation catalytic converter (11) and a NOx storage catalytic converter (31); and upstream of the oxidation catalytic converter and a NOx storage catalytic converter (See Figure 1, and col. 5, lines 20-34).

Regarding claims 17, Murphy et al disclose the production of hydrogen required in each case on demand in the hydrolysis unit (See col. 6, lines 4-10).

Regarding claim 18, Murphy et al provides a hydrogen tank (52) that stores a certain quantity of the hydrogen produced by the hydrolysis unit (52) (See Figure 1, and col. 8, lines 40-54).

Regarding claim 19, Murphy et al disclose the use of a pressure sensor (133) to dimension the hydrogen of hydrogen storage tank (52), and disclose that the hydrogen in the tank is used to heat and regenerate the NOx storage catalytic converter (See col. 8, lines 40-45 and col. 6, lines 40-48).

Regarding claim 20, Murphy et al disclose registering the temperature of the exhaust gas (See col. 12, lines 64-68) and registering certain operating conditions of the catalytic converter (See col. 7, lines 23-29).

Regarding claims 21, 24, and 25, Murphy et al disclose, in col. 6, lines 33-45, conditioning the catalyst (i.e. heating, cleaning, and/or activating) by injecting hydrogen, this clearly is a regenerating step that inherently will restore the conversion rate after sulfur poisoning, at oxidations stages of the NOx catalytic converter.

Regarding claims 22 and 23, Murphy et al disclose the claimed method wherein the internal combustion engine is either a diesel or gasoline engine (see col. 8, lines 65-67) and disclose in col. 7, line 30 to col. 8, line 67, that the hydrogen is added in order to compensate for the hydrocarbons removed by their oxidation in the oxidation catalyst.

Regarding claim 27, Murphy et al disclose an apparatus comprising: an electrolysis unit (52) (instant hydrolysis unit); a metering device (138, 137) connected to the electrolysis unit via a hydrogen line; a control/regulating unit (132) that is functionally connected to the hydrolysis unit and the metering device; and additional points at which hydrogen is added to the exhaust gas in a direction of flow of the exhaust gas in a location selected from between an oxidation catalytic converter (11) and a NO_x storage catalytic converter (31), and upstream of the oxidation catalytic converter and a NO_x storage catalytic converter (See Figure 1, and col. 5, lines 20-34).

Regarding claim 28, Murphy disclose the use of solenoid valves (137, and 138)

Regarding claim 29, Murphy et al disclose the use of a hydrogen storage tank (52) downstream of the electrolysis unit (50).

Regarding claim 30, the control/regulating unit (132) comprises a catalytic converter monitoring function (51) that is functionally connected to an exhaust-gas sensor system (See col. 12, lines 58-68).

No difference is seen between the instantly claimed invention and Murphy et al invention.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 16 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murphy et al in view of EP 758713 A1 (Murachi et al)

Murphy et al apply herein as above.

Regarding the limitation of claim 16 that reads “performing the delivery of the hydrogen in a direction of flow of the exhaust gas at a location upstream of the oxidation catalytic converter and a particle filter of an exhaust gas line” and claim 26, Murphy et al disclose that the method can be used in diesel engines, but fails to disclose that the diesel engine exhaust gas line comprises a particle filter (for claim 16) and fail to disclose raising the temperature of the exhaust gas in order to guarantee that regeneration conditions are met when the particle filter is employed (for claim 26).

Murachi et al is relied upon to teach that diesel engines exhaust-gas lines contain an oxidation catalyst (5); a particle filter (7); and a NOx storage catalytic converter (9) in that order (See Abstract and Figure 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have had a particle filter downstream from the oxidation catalyst in the exhaust – gas line of Murphy et al and delivered the hydrogen in the diesel engine of Murphy et al at a location upstream of the oxidation catalyst and a particle filter in the exhaust-gas line, since

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Murachi et al recognizes that it is common and well known that the particle filter is downstream from the oxidation catalyst and since Murphy et al disclose the addition of hydrogen before the oxidation catalyst.


In regards to claim 26, Murachi et al disclose that in order to regenerate the particle filter the exhaust gas temperature should be increased (See col. 4, lines 3-15). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have raised the temperature of the exhaust gas in the diesel internal combustion engine containing a particle filter of Murphy et al to regenerate the particle filter.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maribel Medina whose telephone number is (703) 305-1928. The examiner can normally be reached on Monday through Friday from 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (703) 308-3837. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


Maribel Medina
Examiner
Art Unit 1754